Detection Of Rhinovirus-associated Asthma Exacerbation in Egyptian Children

Thesis

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Contents

List of Abbreviations

AHR	Airway hyper responsiveness
APCS	Antigen presenting cells
ARI	Acute respiratory illness
BAL	Bronchoalveolar lavage
COPD	Chronic obstructive pulmonary disease
CyslTS	Cysteinyl leukotriene
ETS	Environmental Tobacco Smoke
FEF:	Forced expiratory flow rate
FeNO	Fractional exhaled NO
FRC_{pleth}	Functional residual capacity
FVC	Forced vital capacity
HBEC	Human bronchial epithelial cells
HBoV	Human Bocavirus
HMPV	Humanmetapneumovirus
HPIV	Human parainfluenza virus
HRV	Human rhinovirus (HRV)
ICAM-1	Intercellular adhesion molecule 1
ICS	Inhaled corticosteroids
IFNs	Interferons
IgE	Immunoglobulin E
IRES	Internal ribosome-entry site

ISAAC	International Study of Asthma and Allergies in Childhood
LABAS	Long acting beta 2 agonists
LOX5	5-lipooxygenase
LRTIs	lower respiratory tract infections
LT	Leukotriene modifiers
LTRAs	Leukotriene receptor antagonist
MDA5	Melanoma differentiation associated gene-5
NO_2	Nitric oxide
O_3	Ozone
PAMPs	Pathogen associated molecular patterns
PBMCs	Peripheral blood mononuclear cells
PCR	Polymerase chain reaction
PEFR	Peak expiratory flow rate
PEFR	Peak expiratory flow rate
PM	Particulate matter
PPRs	Pathogen recognition receptors
PRR	Pattern-recognition receptor
Raw	Airway resistance
RIG-I	Retinoic acid inducible gene
RSV	Respiratory syncytial virus
RSV	Human respiratory syncytial virus

RT	Reverse transcription
RV	Rhinovirus
RV	Residual volume
SABA	Short acting beta2 agonists
sRaw	Specific airway resistance
Th	T-lymphocyte helper
Th1 and Th2	T helper 1 cells and T helper 2 cells
TLC	Total lung capacity
TLR	Toll like receptor
TSLP	Thymic stromal lymphopoeitin
VC	Vital capacity

List of Tables

List of Figures

Introduction

Asthma is the most common respiratory chronic disease of childhood: its prevalence has been rising for the last three decades, up to the point to currently affect a proportion of children as high as 10%. It is a heterogeneous condition expressed through a plethora of phenotypes that mirror diverse, not fully characterized underlying mechanisms. From this perspective, the definition of asthma as a syndrome rather than a single entity would do justice to the multitude of immunologic, mechanistic and structural factors that orchestrate its pathogenesis ***(Martin et al., 2005).***

Asthma exacerbations, are sudden-onset, episodic deteriorations of preexisting disease, and a key cause for anxiety and impaired quality of life in children .They are acute or subacute episodes of progressively worsening shortness of breath, cough, wheezing, and chest tightness, or some combination of these symptoms, characterized by decreases in expiratory airflow and objective measures of lung function (spirometry and peak flow) ***(Dougherty et al., 2007).***

The precipitants of acute asthma exacerbations are numerous and include viruses, allergens (dust mite, pollen, animal dander), occupational exposures (grains, flours, cleaning agents, metals, irritants, woods), hormones (menstrual asthma), drugs (ASA, NSAIDs, beta-blockers), exercise, stress, and air pollutants. ***(Nicholoson et al., 1993***

A wide range of respiratory viruses, including rhinoviruses, respiratory syncytial virus (RSV), influenza viruses, coronaviruses, human parainfluenza viruses, enteroviruses, human metapneumovirus (HMPV), and the recently discovered human bocavirus, have been detected from patients with asthma exacerbations. Rhinovirus (RV) constitutes the key culprit for virus-induced asthma attacks. RV (genus *Enterovirus,* family *Picornaviridae*), a virus of considerable heterogeneity comprising over 100 serotypes, is the main cause of common cold and is consistently associated with sudden-onset asthma attacks in children and adults ***(Jortti et al., 2003).*** Typically, RVs are segregated in to two groups, HRV-A and HRV-B, although a new, potentially more virulent and exacerbation-relevant group (HRV-C), has recently been identified. RVs are predominant during the spring and autumn, and they have been incriminated for the peak in pediatric asthma exacerbations ***(Plethora et al., 2008).***